CLAIMS

What is claimed is:

1. A method of luminance correction comprising:

providing two images of a same scene;

determining a spatial coherence and color statistics of the two images; and

utilizing the determined color statistics and spatial coherence to enhance one of the two images.

2. A method as recited in claim 1, wherein the images are taken in a dim lighting condition.

3. A method as recited in claim 1, wherein one of the two images is underexposed.

4. A method as recited in claim 1, wherein one of the two images is blurred.

5. A method as recited in claim 1, wherein an underexposed one of the two images is enhanced.

6. A method as recited in claim 1, wherein the two images are related by the color statistics and the spatial coherence.

7. A method as recited in claim 1, further comprising downloading the two images to a general-purpose computer, the general-purpose enhancing one of the two images.

8. A method as recited in claim 1, further comprising downloading the two images to a general-purpose computer, the general-purpose determining one or more of the color statistics and spatial coherence.

9. A method as recited in claim 1, further comprising modifying a color mapping function of the two images to cover a relatively larger range for a high contrast scene.

10. A method as recited in claim 1, further comprising utilizing color histogram equalization to determine the color statistics.

11. A method as recited in claim 1, further comprising utilizing color histogram equalization to determine the color statistics, wherein the color histogram equalization comprises:

transferring the two images to a perception-based color space;

clustering color distributions in the perception-based space;

performing histogram equalization in the perception-based space; and

transferring a result of the histogram equalization to a red-green-blue space.

12. A method as recited in claim 1, further comprising utilizing spatial region matching to determine the spatial coherence.

13. A method as recited in claim 1, further comprising utilizing spatial region matching to determine the spatial coherence, wherein the spatial region matching comprises:

segmenting a blurred one of the two images into a plurality of similarly colored regions;

eroding each of the regions;

determining a number of iterations to completely erode each region;

determining a region center for each of the regions;

sorting the iteration numbers in descending order;

selecting pixel pairs from the images in matching positions; and

calculating a neighborhood value for each selected pixel.

14. A method as recited in claim 1, further comprising using an exposure bracketing feature of a digital camera to provide the two images.

15. A method as recited in claim 1, wherein the method is performed by a digital camera.

16. One or more computer readable media storing computer executable instructions that, when executed, perform the method as recited in claim 1, wherein the one or more computer readable media are incorporated inside a digital camera.

17. A method of luminance correction comprising:

providing an underexposed image of a scene;

providing a blurred image of the same scene;

determining a spatial coherence and color statistics of the images; and

utilizing the determined color statistics and spatial coherence to enhance the underexposed image.

18. A method as recited in claim 17, wherein the images are taken in a dim lighting condition.

19. A method as recited in claim 17, wherein the images are taken successively in a short interval.

20. A method as recited in claim 17, further comprising utilizing color histogram equalization to determine the color statistics.

21. A method as recited in claim 17, further comprising utilizing color histogram equalization to determine the color statistics, wherein the color histogram equalization comprises:

transferring the images to a perception-based color space;

clustering color distributions in the perception-based space;

performing histogram equalization in the perception-based space; and

transferring a result of the histogram equalization to a red-green-blue space.

22. A method as recited in claim 17, further comprising utilizing spatial region matching to determine the spatial coherence.

23. A method as recited in claim 17, further comprising utilizing spatial region matching to determine the spatial coherence, wherein the spatial region matching comprises:

segmenting a blurred one of the images into a plurality of similarly colored regions;

eroding each of the regions;

determining a number of iterations to completely erode each region;

determining a region center for each of the regions;

sorting the iteration numbers in descending order;

selecting pixel pairs from the images in matching positions; and

calculating a neighborhood value for each selected pixel.

24. One or more computer readable media storing computer executable instructions that, when executed, perform the method as recited in claim 17.

25. A digital camera configured to perform the method as recited in claim 17.

26. One or more computer-readable media having instructions stored thereon that, when executed, direct a machine to perform acts comprising:

providing two images of a same scene;

determining a spatial coherence and color statistics of the two images; and

utilizing the determined color statistics and spatial coherence to enhance one of the two images.

27. A computer-readable medium as recited in claim 26, wherein the acts further comprise modifying a color mapping function of the two images to cover a relatively larger range for a high contrast scene.

28. A computer-readable medium as recited in claim 26, wherein the acts further comprise utilizing color histogram equalization to determine the color statistics.

29. A computer-readable medium as recited in claim 26, wherein the acts further comprise utilizing color histogram equalization to determine the color statistics, wherein the color histogram equalization comprises:

transferring the two images to a perception-based color space;

clustering color distributions in the perception-based space;

performing histogram equalization in the perception-based space; and

transferring a result of the histogram equalization to a red-green-blue space.

30. A computer-readable medium as recited in claim 26, wherein the acts further comprise utilizing spatial region matching to determine the spatial coherence.

31. A computer-readable medium as recited in claim 26, wherein the acts further comprise utilizing spatial region matching to determine the spatial coherence, wherein the spatial region matching comprises:

segmenting a blurred one of the two images into a plurality of similarly colored regions;

eroding each of the regions;

determining a number of iterations to completely erode each region;

determining a region center for each of the regions;

sorting the iteration numbers in descending order;

selecting pixel pairs from the images in matching positions; and

calculating a neighborhood value for each selected pixel.

32. One or more computer-readable media having instructions stored thereon that, when executed, direct a machine to perform acts comprising:

providing an underexposed image of a scene;

providing a blurred image of the same scene;

determining a spatial coherence and color statistics of the images; and

utilizing the determined color statistics and spatial coherence to enhance the underexposed image.

33. A computer-readable medium as recited in claim 32, wherein the acts further comprise utilizing color histogram equalization to determine the color statistics.

34. A computer-readable medium as recited in claim 32, wherein the acts further comprise utilizing color histogram equalization to determine the color statistics, wherein the color histogram equalization comprises:

transferring the images to a perception-based color space;

clustering color distributions in the perception-based space;

performing histogram equalization in the perception-based space; and

transferring a result of the histogram equalization to a red-green-blue space.

35. A computer-readable medium as recited in claim 32, wherein the acts further comprise utilizing spatial region matching to determine the spatial coherence.

36. A computer-readable medium as recited in claim 32, wherein the acts further comprise utilizing spatial region matching to determine the spatial coherence, wherein the spatial region matching comprises:

segmenting a blurred one of the images into a plurality of similarly colored regions;

eroding each of the regions;

determining a number of iterations to completely erode each region;

determining a region center for each of the regions;

sorting the iteration numbers in descending order;

selecting pixel pairs from the images in matching positions; and

calculating a neighborhood value for each selected pixel.

37. An apparatus comprising:

means for providing two images of a same scene;

means for determining a spatial coherence and color statistics of the two images; and

means for utilizing the determined color statistics and spatial coherence to enhance one of the two images.

38. An apparatus as recited in claim 37, further comprising means for modifying a color mapping function of the two images to cover a relatively larger range for a high contrast scene.

39. An apparatus as recited in claim 37, further comprising means for utilizing color histogram equalization to determine the color statistics.

40. An apparatus as recited in claim 37, further comprising means for utilizing spatial region matching to determine the spatial coherence.